Inspection Criteria for UTP/Fiber Optic Installations

Industry Standards

ANSI/TIA/EIA publishes standards for the manufacturing, installation, and performance of electronic and telecommunications equipment and systems. Five of these ANSI/TIA/EIA standards govern telecommunications cabling in buildings. Each standard covers a specific part of building cabling. They address the required cable, hardware, equipment, design and installation practices. In addition, each ANSI/TIA/EIA standard lists related standards and other reference materials that deal with the same topics.

NIH/CIT/DNST will always expect the installations of all Information Technology Infrastructures to follow the most current standards. For information on obtaining "Standards Documents" see "Note A" at the end of this document.

The building cabling standards that have a direct bearing on this document include the following:

ANSI/TIA/EIA-568-A	*Commercial Building Telecommunications Cabling Standard July 1991*
ANSI/EIA/TIA-569	*Commercial Building Standard for Telecommunications October 1990*
ANSI/EIA/TIA-570	*Residential and Light Commercial Telecommunications Wiring Standard May 1991*
ANSI/TIA/EIA-606	*Administration Standard for the Telecommunications Infrastructure of Commercial Building February 1993*
ANSI/TIA/EIA-607	*Commercial Building Grounding and Bonding Requirements for Telecommunications August 1994*

In addition, the National Electrical Code 1999 (NEC) ANSI/NFPA-70 , published by the National Fire Protection Association (NFPA), provides electrical safety standards that protect people and property from fires and electrical hazards.

Key Personnel Requirements

* The Contractor shall have at least one BICSI certified RCDD on staff at all times during any installation performed.
* The Contractor shall provide at least one cable foreman that is a BICSI Registered Cabling Installation Technician. This person may also be an RCDD Quality Control Person.
* The Contractor will provide quality control personnel onsite at all times during the cable installation.
* The Contractor shall notify the CIT Project Officer(s) of proposed substitutions to key personnel within 15 calendar days. Proposed substitutes shall have comparable qualifications to persons they have replaced.

Telecommunications Closet Set-up

Inspections that will be performed on the Telecommunications Closet Set-up section will include:

* Ladder rack placement and configuration.
* Matching of existing LAN racks, placement of LAN racks.
* Telecommunications Closet Grounding.
* Wall Field layout and matching of existing equipment types.
* Wall field terminations and cross connects.
* Prior approval before placement of closet hardware is required before closet build-out begins.

Cable Installation

Strict attention to manufacturer's guidelines on bend radii and maximum pulling tension during installation, should be observed.

Inspections that will be performed on Cable Installations shall include:

* There shall be no kinks or evidence of kinks in the cables or damage to the outer jacket caused by twisting of the cable jacket during installation. If so, this cable must pass electronic testing.
* The bend radius of UTP cables shall be equal to or greater than 1½".
* The bend radius of fiber optic cables shall be equal to or greater than 2 ½".
* The geometry of the UTP pairs or shape of the cable shall be maintained at all times.
* Plastic tie straps that are around the cables shall not distort the cable shape or leave an imprint on the cable jacket.
* Cables leaving the main cable runs at plastic tie wraps points, shall maintain the minimum UTP bend radius of 1½".
* Unshielded-Twisted-Pair cable shall not be placed in parallel with electrical wiring for more than 12'.
* The distance between parallel UTP cables and electrical wires shall be a minimum of 12" of separation between them.
* UTP cables and electrical cables shall cross at right angles to each other when required.
* A minimum of 5" space shall be maintained between the fluorescent light fixtures and UTP cables.
* 4' of space shall be maintained between UTP cables and electric motors and transformers.
* All UTP and fiber optic cable shall be placed in cable tray where available.
* UTP or Fiber optic cabling system shall be self supporting and shall not touch any part of a fire sprinkler system, ductwork, ceiling grid, or drain-lines.
* All cable infrastructure and cable support devices shall be BICSI or TIA/EIA approved for all UTP CAT 5e and fiber optic cables.
* Cable support devices shall not be placed directly over a Work Area Outlet. This increases the pos sibility of a cable bend radius less than 1½" for cables serving the WAO.
* There shall be 3' of slack of fiber optic cable at each end of the Interbuilding and riser cables.
* All installed cable, station jacks and patch panels and wiring termination blocks shall meet or exceed manufacturer specifications.
* All installations shall comply, minimally, with the TIA/EIA 568A, and 569 documents and BICSI
* recommendations.
  Grounding of cable tray and conduit runs.
* Non-compliant cables shall be inspected for remedial action. If corrective action can bring the cable into compliance, then that action will be taken. If corrective action cannot bring the cable into com pliance or the cable is still found to be non-compliant after corrective action has been taken, the non-compliant cable shall be replaced with a new cable and re-tested and certified.

Any deviation from the above specifications shall require in writing prior approval of the CIT Project Officer before the Contractor proceeds.

Work Area Outlet Installation

Inspections that will be performed on Work Area Outlets Installations shall include:

* There shall be no more than 12 " UTP cable slack stored at the Work Area Outlet.
* There shall be no more than 12 " of slack of fiber optic cable stored at the Work Area Outlet.
* The maximum amount of exposed wire pairs from the cable jacket at the cable termination point shall be no more 3/4".
* All installation personnel shall have a current certification by the manufacturer of the proposed installation products by the beginning of the project. Failure to comply risks the installer being barred from the project until the required certification is obtained.

Fire Stopping

Inspections that will be performed on Fire Stopping Practices shall include:

* Proper materials used in the Firestopping application.
* Proper installation of Firestopping materials per UL document.
* A copy of the UL document of Firestopping procedures shall be submitted to CIT Project Officer prior to installation.

Testing

Transmission requirements UTP, STP-A, and fiber optical cables will fall under ANSI/TIA/EIA-568-A standard. TIA/EIA Technical Service Bulletin 67 (TSB67) defines field-testing performance for UTP and ScTP CAT 3, 4 and 5e cabling systems. This document specifies the electrical characteristics of field testers, test methods and minimum transmission requirements for installed UTP cabling. TSB67 does not address testing specifications for STP-A cabling systems.

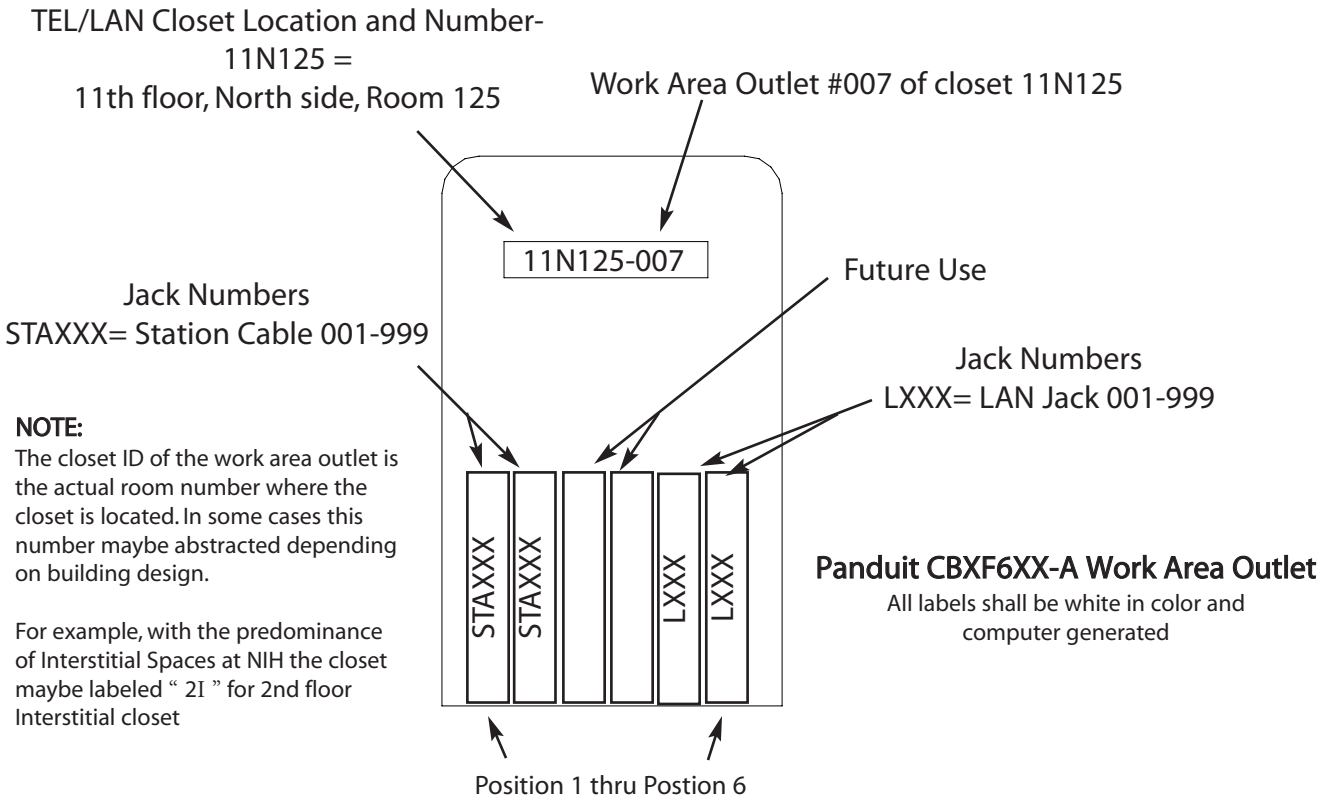
Inspections that will be preformed on Testing Procedures shall include:

* Diagnostic tools and procedures used to test cabling systems specific transmission requirements.
* Documentation of the test results will be required. A format for testing documentation will be provided by the CIT Project Officer.
* Cable testing procedures and instruments will be pre-approved by CIT Project Officer.
* All testing will be tested under Technical Service Bulletin 67.

Deliverables

As-built drawings shall be in Auto-Cad format and/or Hard Copy prints.
Cut-sheets for cable and telephone installs shall be delivered electronically in an Excel format.
Testing Results for both Fiber and Copper shall be delivered electronically in an Excel format.
Media for the electronic data shall be delivered on either Compact Disc or Zip Disc.

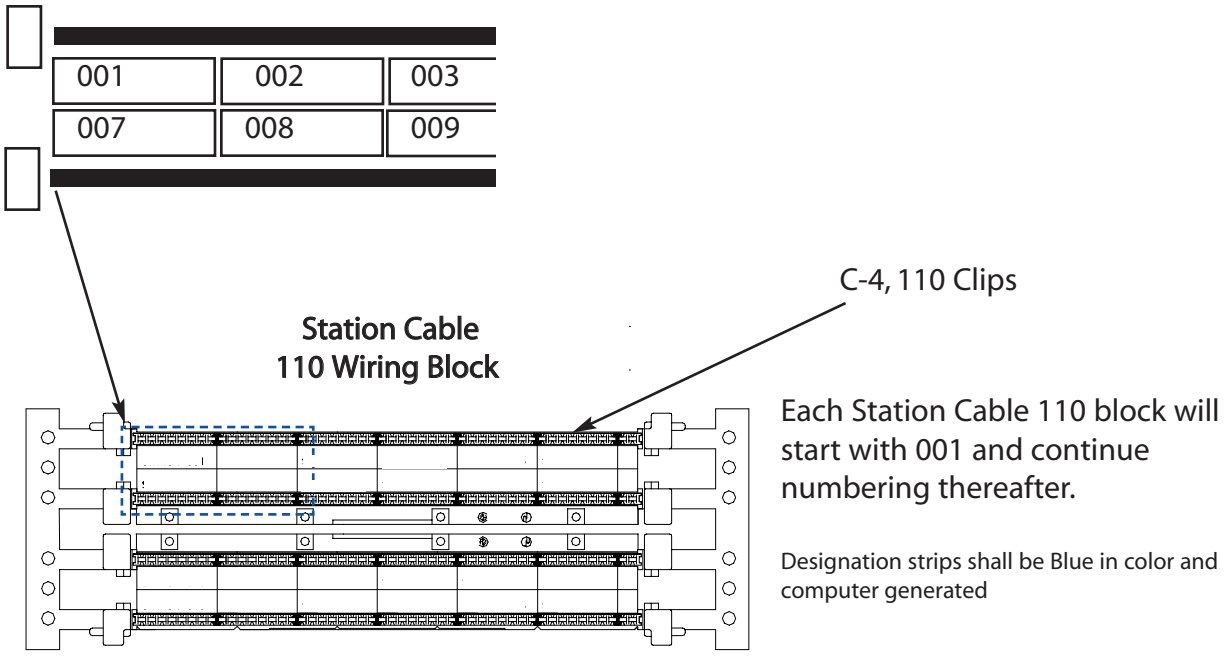
Labeling and Wiring Criteria



NOTE:
The closet ID of the work area outlet is the actual room number where the closet is located. In some cases this number maybe abstracted depending on building design.

For example, with the predominance of Interstitial Spaces at NIH the closet maybe labeled " 2I " for 2nd floor Interstitial closet

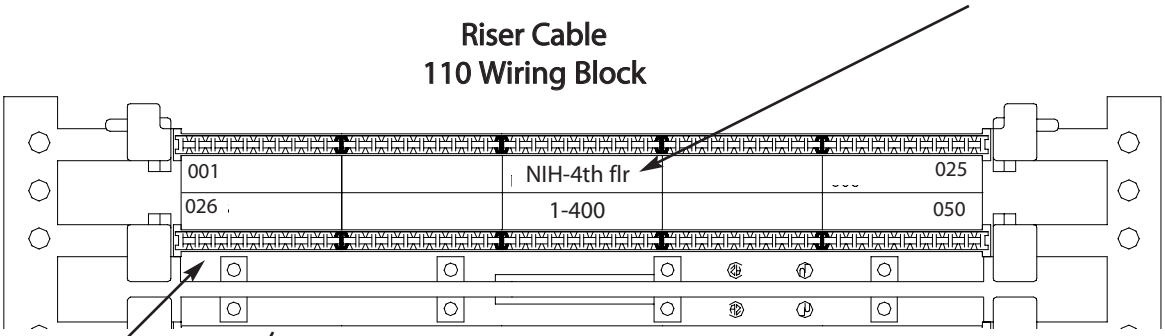
Panduit CBXF6XX-A Work Area Outlet
All labels shall be white in color and computer generated



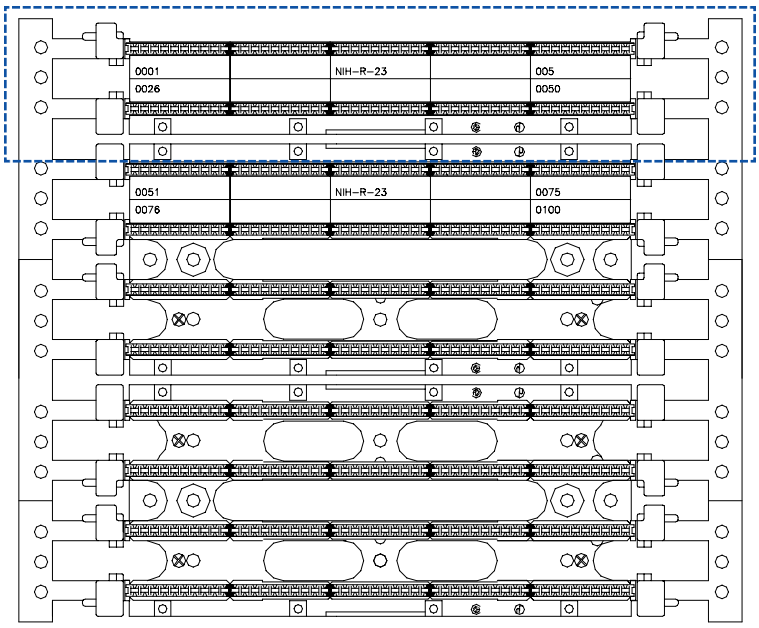
Each Station Cable 110 block will start with 001 and continue numbering thereafter.

Designation strips shall be Blue in color and computer generated

NIH-4th flr=National Institutes of Health, 4th floor, Count at this TC is 1-400

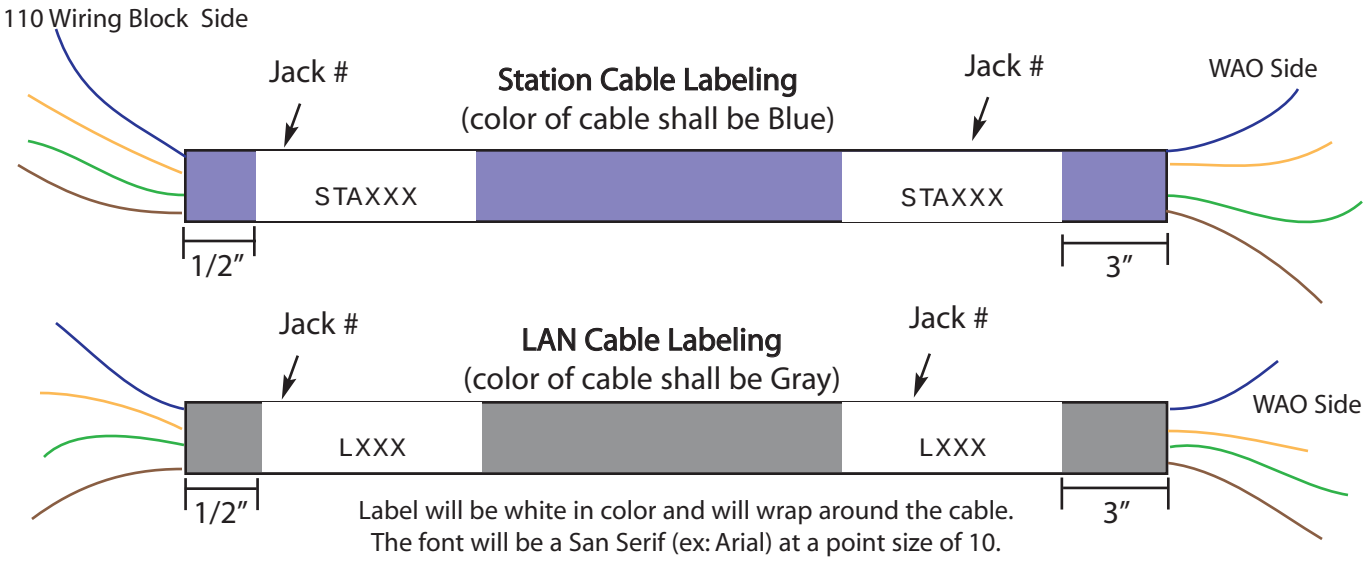


C5, 110 Clips



Riser counts shall start at pair 001 and counts shall start at the top floor of a building. When multiple closets are on a floor they shall be numbered sequentially before a lower floor is numbered.

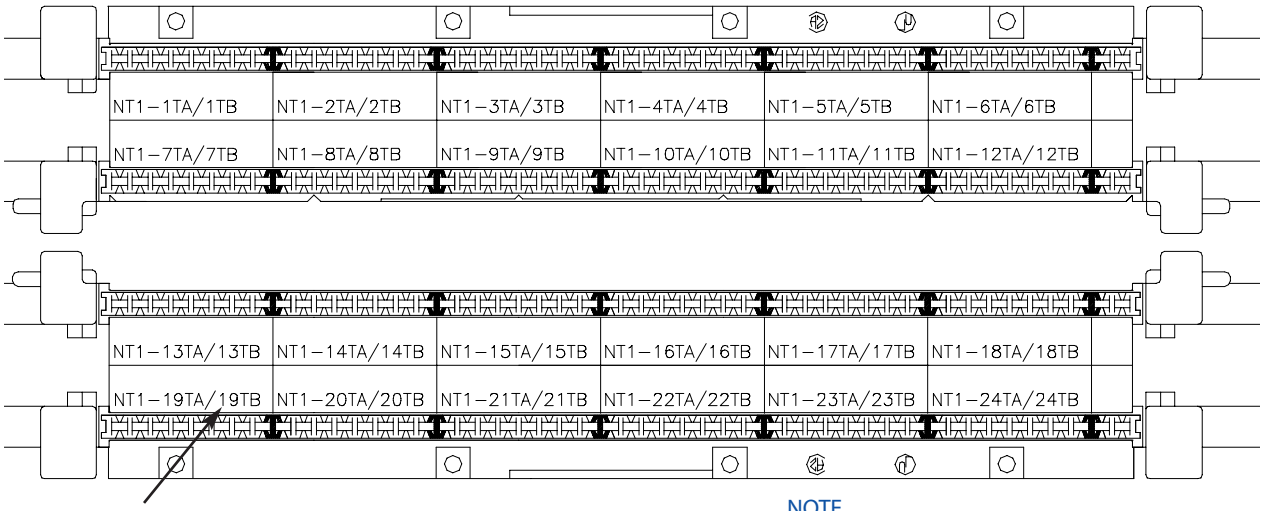
Designation strips shall be white in color.



Label will be white in color and will wrap around the cable.
The font will be a San Serif (ex: Arial) at a point size of 10.
(You are reading a 10 point size)

NT1 Connections out of Equipment Labeling
110 Wiring Block

Designation Strip shall be purple in color



ISDN Channel out of NT1 equipment connection: 19th NT1 Card channel A/Channel B

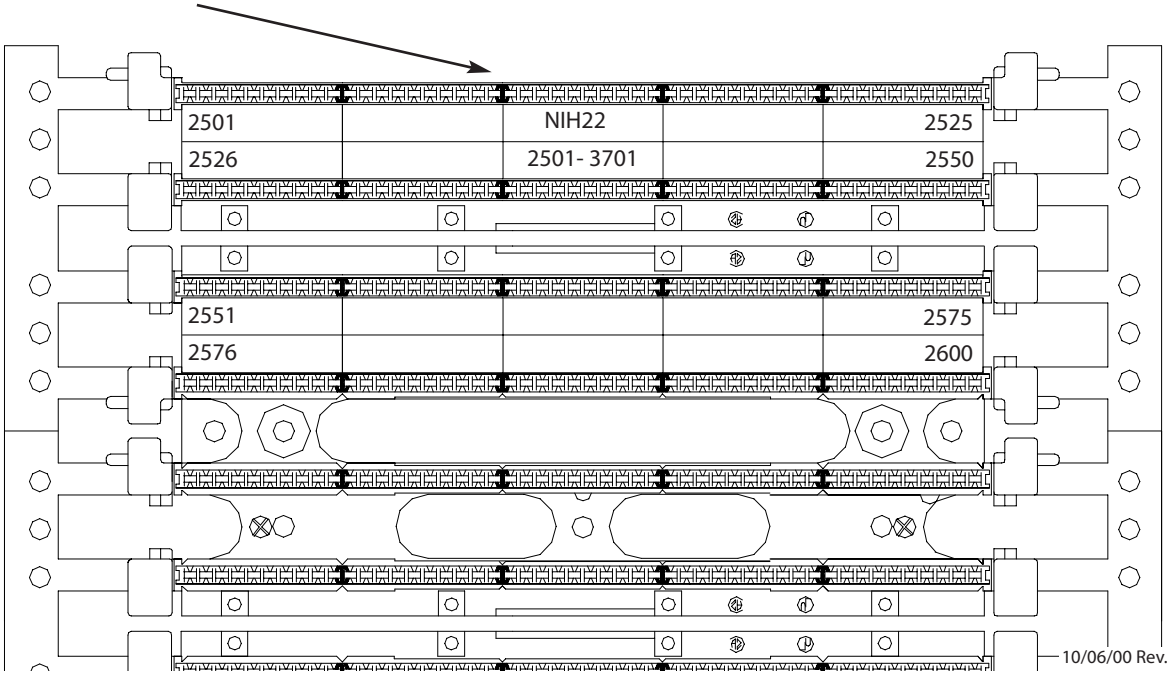
NOTE

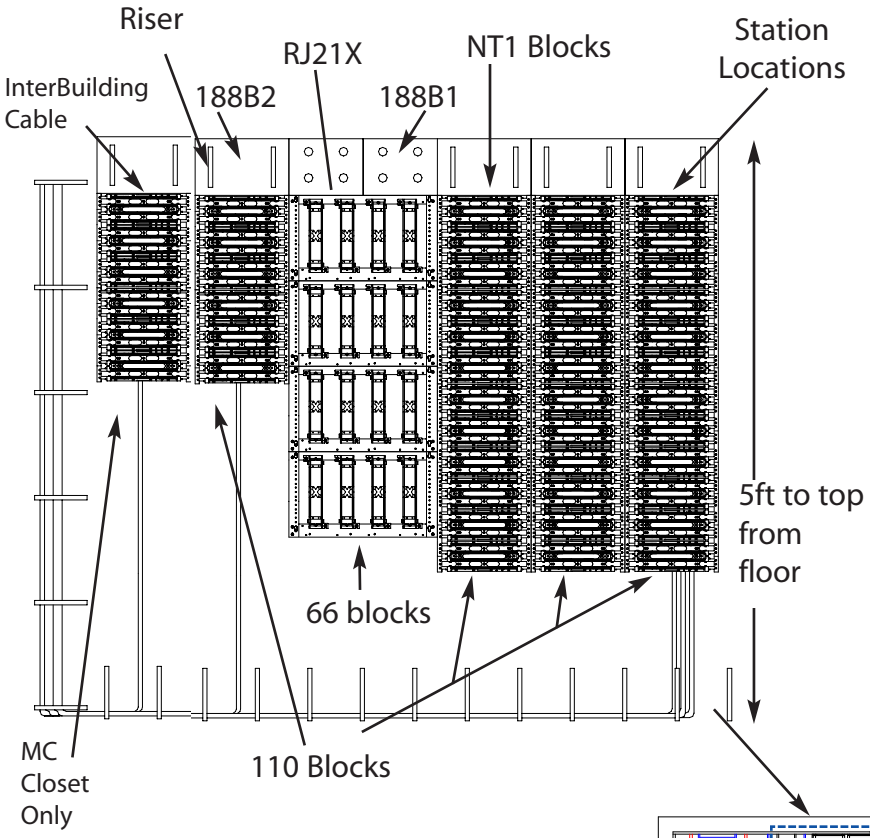
The ISDN Circuits into the NT1 equipment (PR48 & PR96) connection shall be terminated on split 50 66-M2 block using the block as an RJ21X interface.

Interbuilding Cable Connections
110 Wiring Block

Designation Strip shall be brown in color

First block of every row shall have cable number and active pair count

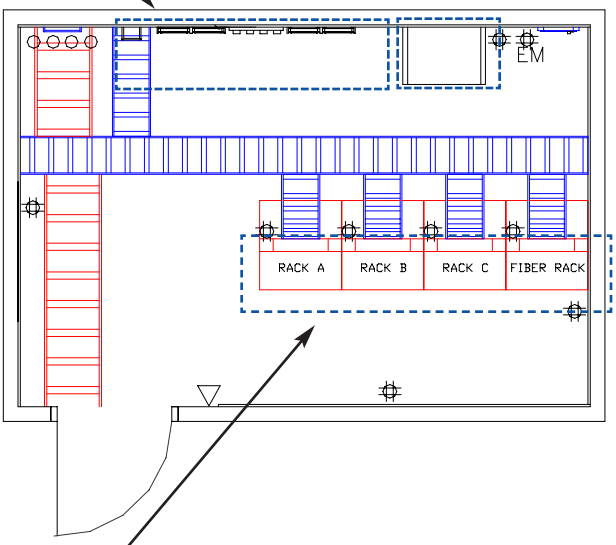


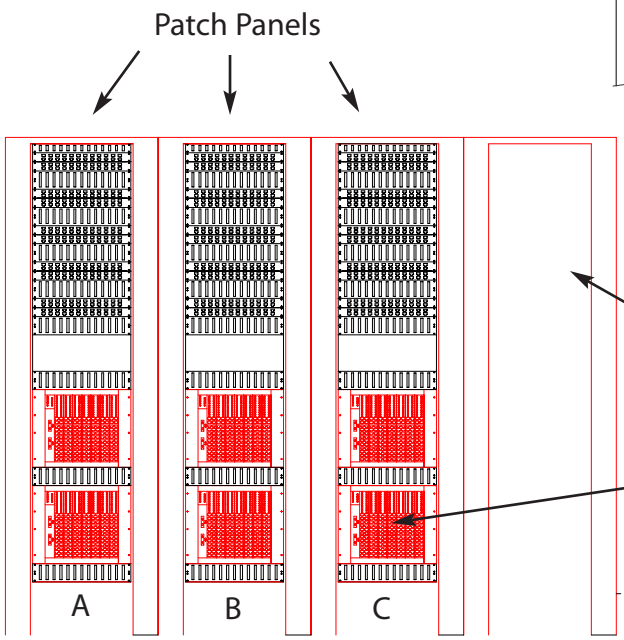


Power Rack 48 or 96.
The position on this item varies depending on room size and wall availability. Position of this item should be cleared by Cable Infrastructure before installation. For dimension info: www.seipower.com

Generic Closet Set-up

This is a Generic Closet setup, spacing will be determined by closet size, amounts of riser, number of station cables and Interbuilding cable sizes. The general placement of the pieces of the closet build out should be layed out as per this document.





This Document

Please refer any questions concerning this document to:

Center for Information Technology/Division of Networking Services and Telecommunications
Cable Infrastructure
Richard Charles, Manager Cable Infrastructure CIT/DNST
6120 Executive Blvd
Suite 300
Rockville, MD 20852
(301) 435-6558

Note A

Information on standards addressed in this document can be obtained from the following organizations:

Telecommunications Industry Association (TIA)
1300 Pennsylvania Ave., Suite 350
Washington, D.C. 20004 USA
ph: (202) 383-1480
fax: (202) 383-1495
TTY: (202) 383-1499
http://www.tiaonline.org

Electronic Industries Alliance (EIA)
2500 Wilson Boulevard
Arlington, VA 22201
ph: (703) 907-7500
http://www.eia.org

BICSI World Headquarters
8610 Hidden River Parkway
Tampa, FL 33637-1000 USA
ph: (800) 242-7405 or (813) 979-1991
fax: (813) 971-4311
http://www.bicsi.org

National Fire Protection Association (NFPA/National Electric Code)
1 Batterymarch Park
PO Box 9101 Quincy, MA 02269-9101
http://www.nfpa.org

American National Standards Institute (ANSI)
7315 Wisconsin Avenue
Suite 250-E
Bethesda, Maryland 20814
ph: (301) 469-3360
fax: (301) 469-3361
http://www.ansi.org

Inspection Criteria for UTP/Fiber Optic Installation Inspection Form

Job #_____Job Location_____

Date_____Inspector_____Percentage Complete_____

Key Personnel Requirements	Pass	Fail	Comments
	_____	____	_____

Pre-Installation Inspection	Pass	Fail	Comments
Rack Configuration Layout	____	____	_____
Pathways Layout	____	____	_____
LAN Rack Layout	____	____	_____
Wall Field Layout	____	____	_____

Riser Cabling	Pass	Fail	Comments
Copper Riser Cable Splice	____	____	_____
Fiber Optic Riser Cable Splice	____	____	_____
Riser are Correct Type	____	____	_____
Labeling of all Riser Cabling	____	____	_____
Pathways Layout	____	____	_____

Horizontal Cable Placement	Pass	Fail	Comments
Pathways Layout	____	____	_____
Cable supports	____	____	_____
Cable Tension	____	____	_____
Cable slack	____	____	_____
Bend radius observed	____	____	_____
Basic Link @ 90meters	____	____	_____

Work Area Outlet	Pass	Fail	Comments
Cable geometry maintained	____	____	_____
Cable Slack	____	____	_____
Outlet level & correct type	____	____	_____
Labeling	____	____	_____

Firestopping	Pass	Fail	Comments
Proper materials used	____	____	_____
Proper Installation	____	____	_____
UL Installation Doc received	____	____	_____

Job #_____Job Location_____

Date_____Inspector_____Percentage Complete_____

Testing		Pass	Fail	Comments
Instrument approval	____	____		_____
Documentaion	____	____		_____

Final Inspection & Deliverables	Pass	Fail	Comments
As-builts recieved	____	____	_____
Test Reports recieved	____	____	_____
Housekeeping	____	____	_____
Cut Sheets	____	____	_____

Additional Comments

_____

_____

_____

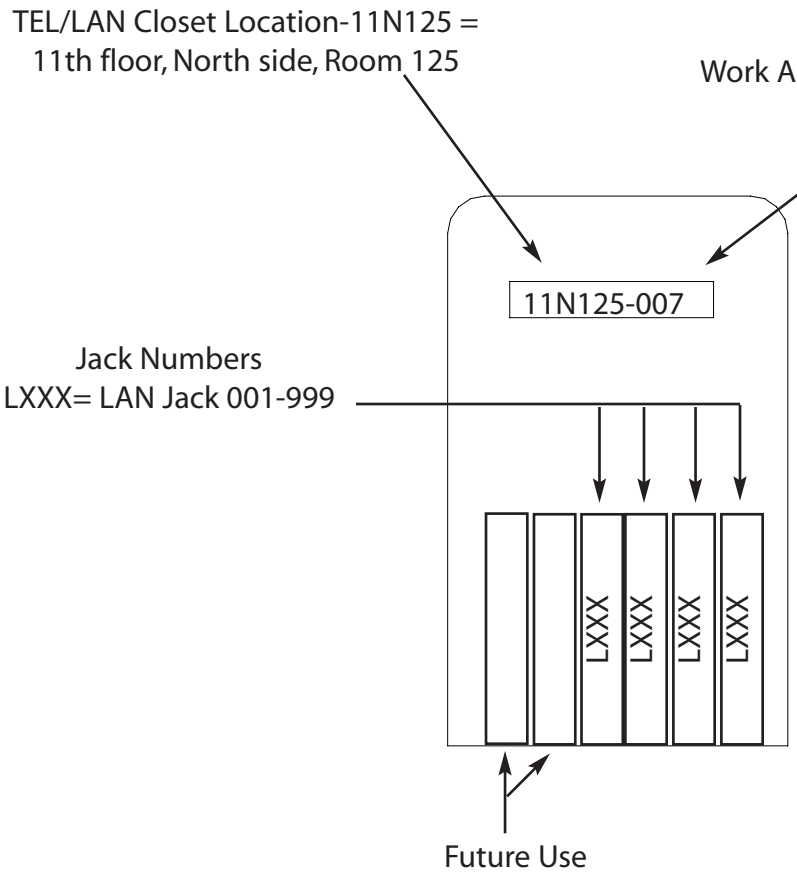
_____

_____

_____

Sign-off

	CIT Project Manager	Date
Key Personnel Requirements	_____	
Riser Cabling	_____	
Horizontal Cable Placement	_____	
Work Area Outlet	_____	
Firestopping	_____	
Testing	_____	
Final Inspection & Deliverables	_____	



Addendum #1

DATA HEAVY WAO

Panduit CBXF6XX-A Work Area Outlet

All labels shall be white in color and computer generated